

Patent claims

1. A device for determining the concentration of one or more substances in a mixture by measuring the concentration-dependent molecule-specific extinction of radiation, comprising

- an absorption chamber filled with the sample to be measured,
- a radiation source, and
- two, or a number divisible by two of, receivers, one pair of receivers being associated with the measurement of the concentration of each component of the mixture,

wherein

- the radiation from the radiation source is split into two, or a number divisible by two of, radiation paths to the receivers,
- all radiation paths from the radiation source to the receivers traverse the substance in the absorption chamber,
- all radiation paths from the radiation source to the receivers traverse the same number and pairwise identical optical elements,
- the two radiation paths leading to a pair of receivers each have a different optical length in the absorption chamber,
- the extinction in each radiation path leading to a pair of receivers is measured at the same wavelength, and
- the measured value or values are determined by comparison of the intensities measured by the receivers (17, 19) of a pair,

characterized in that for splitting the radiation from the radiation source (11) concave mirrors (7, 7a, 9, 9a)

are provided which focus the radiation arriving from the radiation source (11) onto the receivers (17, 19), the two mirrors (7, 7a, 9, 9a) *B* associated with a pair of receivers (17, 19) being disposed at different distances from the radiation source (11) to form radiation paths (22, 23) of different lengths in the absorption chamber (13).

2. A device according to claim 1, characterized in that at least one of the two concave mirrors (7, 7a, 9, 9a) associated with a pair of receivers (17, 19) is formed as an aspheric concave mirror.
3. A device according to claim 2, characterized in that the aspheric concave mirrors (7, 7a, 9, 9a) constitute sections of a spheroid.
4. A device according to any of the above claims, characterized in that the radiation source (11) is an electrically modulable plane radiator.
5. A device according to any of the above claims, characterized in that the absorption chamber (13) is formed by the interior of the housing (1, 2) and the concave mirrors (7, 7a, 9, 9a) are formed integrally with the housing (1, 2).
6. A device according to claim 5, characterized in that the housing (1, 2) is of partite form and the concave mirrors (7, 7a, 9, 9a) are formed integrally with the same housing part (2).
7. A device according to claim 6, characterized in that the radiation source (11) and the receivers (17, 19) are disposed on the other housing part (1).
8. A device according to claim 6 or 7, characterized in that at least the housing part (2) with the concave mirrors (7, 7a, 9, 9a) is made of metal.
9. A device according to claim 8, characterized in that the metal is an aluminum material.

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